

Chapter 50 Aircraft

Aircraft Operations

Refer to NMG Ch. 50 for additional information in most sections.

Aviation resources are used for preparedness activities, supporting emergency incident operations, burn area rehabilitation projects, resource management project work, and administrative movement of resources. Requests for aircraft will be for official use and within Agency policy.

Reminder: Most aviation resources are considered Initial Attack (IA) resources and are subject to diversion at any time for higher priority incidents based upon consideration of safety and values at risk. Orders for these aviation resources should be based on actual current incident needs.

High Density Altitude Aviation Operations

For All Personnel: Flight operations conducted in the Rocky Mountain Area (RMA), especially parts of Colorado and Wyoming, have potential for high density altitudes (DAs) in both fire and general aviation operations.

At high density altitudes, expectations of performance for both rotor and fixed wing aircraft may not align with reality. All personnel need to understand that at high density altitude the limitations of the aircraft may cause a departure from the normal performance expectations of aircraft at lower elevations.

These changes may include the following:

- The amount of payload will be reduced.
- The speed of delivery will be higher.
- In the case of bucket operations, a reduction in water volume will make it difficult to penetrate any significant canopy. As a result of this volume reduction, the water/retardant will be more susceptible to wind and thus can affect the accuracy of drops.
- High density altitude and variable winds are going to greatly reduce the helicopters ability to slow down to below Effective Translational Lift (ETL) airspeed. Requesting hovering spot drops shall be avoided.
- Aircraft performance must be considered when ordering aviation resources for anticipated high density altitude missions.
- When ordering aircraft from dispatch, ensure you incorporate high density altitude conditions into the request. In special needs in ROSS, request the term HIGH PERFORMANCE aircraft, regardless of type. Also include the operating altitude and operating temperature in special needs.
- Any questions to specific air frames, feel free to direct your calls to:
 - Jim Lawson, USFS R2 Helicopter Operations (HOS) 719-338-3917
 - Mike Amicarella, DOI Helicopter Inspector Pilot (HIP) 303-888-1505.

1 Pilot briefs should include discussions regarding the following:

- 2 • Aircraft capability is negatively affected by the higher density altitudes that are
- 3 likely to be encountered in the RMA.
- 4 • The aircraft's lifting capability is not only affected, but the aerodynamics in
- 5 general is less responsive. The pilots must anticipate (stay ahead of) the aircraft
- 6 flight control inputs.
- 7 • Pilots need to keep the aircraft (if tanked), or the bucket, a minimum of 50 feet
- 8 above the canopy.
- 9 • Pilots need to remain above ETL at all times, avoiding hovering spot drops.
- 10 • Mitigation measures

11 **Definition of Effective Translational Lift (ETL)**

12 ETL is a transitional state present after a helicopter has moved from hover to forward
13 flight. This state provides extra lift, most typically, when the airspeed reaches
14 approximately 16-24 knots, *but is present with any horizontal flow of air across the rotor,*
15 and therefore can be present without any forward motion of the aircraft, given prevailing
16 wind conditions. As a result, the tail rotor also becomes more efficient due to the wind
17 bubble that is formed around the helicopter from progressively less turbulent air.
18

19 **Aircraft Mobilization**

20 All aircraft orders should be coordinated through the local dispatch center. Response
21 times are the most critical aspect of IA resources. The target off-time requirement of 15
22 minutes without compromising pre-flight and flight planning requirements should be
23 adhered to for tactical aircraft.
24

25 The use of Air Attack and/or Lead Planes/Aerial Supervision Module (ASM) is critical
26 for safe and effective support and should be ordered. Refer to the Aerial Supervision
27 Chart found in this chapter.
28

29 Pilots shall not be dispatched or contacted after end of shift (typically 2000 – 0600) to
30 ensure crew rest requirements of 10 hours of uninterrupted rest are met. Orders for charter
31 aircraft should not be placed with vendors during these hours as well, unless they have a
32 company dispatcher available.
33

34  35 Pilots must ensure duty limitations are being met per the Interagency Interim Flight &
36 Duty Limitations which can be found in the Redbook Ch. 16.
37 (Interagency Standards for Fire & Fire Aviation Operations)

38  39 Use of the RMA Aircraft Dispatch Kneeboard format or equivalent is the required method
40 of mobilization of tactical aircraft for initial attack followed up by a ROSS resource order
41 as soon as possible. See Ch. 80 for the RMA Aircraft Dispatch form.

42  **Initial Point (IP):** A reporting location for aircraft, outside of the Fire Traffic Area
43 (FTA), clearly identified by the aerial supervisor (ATGS or ATS). It may be
44 Latitude/Longitude, geographic feature, cardinal direction, fire flank, and includes an
45 altitude. Location may be used for a holding pattern prior to FTA entry.
46

1 **Ordering Tactical Aircraft**

2 Orders for tactical aircraft shall include the following minimum information and will be
3 communicated to the pilots:

- 4 ○ Latitude / Longitude (degrees/minutes)
- 5 ○ Bearing and Distance (nm) to nearby VORs, airports/bases
- 6 ○ Frequencies
 - 7 ■ Flight Following – with dispatch
 - 8 ■ Air to Air - with contact call sign if known
 - 9 ■ Air to Ground - with name of ground contact if known
- 10 ○ Any Hazards in the area - includes “hot” MTRs, powerlines, towers, etc.
- 11 ○ Other aircraft in the area and/or mobilizing to the incident
 - 12 ■ Notification should be made to neighboring dispatch if response is
13 within 5 miles of their boundaries. Refer to local dispatch
14 boundary agreements.
- 15 ○ Reload Base if applicable
- 16 ○ Name of ordering Dispatch Center
- 17 ○ Type of Resources on order, if any – good situational awareness for ATGS
- 18 ○ TFR – yes or no

19
20 The RMACC is ultimately responsible for the movement/tracking of all national aviation
21 resources across RMA dispatch center’s boundaries and within the Geographic Area.

22
23 Centers must notify the RMACC of the commitment and release of national and area
24 resources. (Refer to NMG/RMG 10)

25 **Local Airport Operations**

26 RMA Ramp Operations: When fire related aircraft activity is anticipated to impact any
27 airport, appropriate airport overhead are required to manage operations (i.e., Airport
28 Liaison, Fixed Wing Base Manager (FWBM), Ramp Manager (RAMP), etc.)

29
30
31 It is the responsibility of the assigned airport personnel (i.e., Airport Liaison, FWBM,
32 RAMP, etc.) to keep local dispatch promptly informed of all incident aircraft activity.
33 This includes aircraft arrivals, departures, resources status, personnel, and all other
34 pertinent information. Simultaneously, dispatch will communicate and coordinate with
35 the assigned airport personnel as needed.

36 **Prioritizing Incidents**

37
38 All requests will be processed in accordance with the standard fire priority criteria (Refer
39 to NMG/RMG 10).

40 Prioritization is a key factor in rapid response and aggressive tactics. Initial Attack takes
41 priority. However, when competition exists for tactical aircraft, every request must
42 specifically identify the Values at Risk as identified in the NMG/RMG 10.

43 **Aircraft Demobilization**

44
45 When an incident enters into extended response phase, every effort should be made to re-
46 establish Initial Attack resources. Refer to RMG 10 for Release Priority Guidelines.

1 **Flight Management Procedures**

2 (Refer to NMG 50)

4 **Sterile Cockpit:**

5 Upon takeoff and landing, pilots must concentrate on Federal Aviation Administration
6 (FAA) communications and traffic awareness. Dispatch communications may remain
7 unanswered during these operations. Contact will be established/re-established once
8 practical and safe. Sterile cockpit duration may vary depending on airspace and
9 communications complexity. In general, count on five nautical miles as a sterile cockpit
10 guideline. **Dispatchers should refrain from attempting contact during this time.**

11
12 Many federally-procured aircraft by contract must be equipped with Automated Flight
13 Following (AFF). AFF can mitigate tracking issues during sterile cockpit operations.
14 Dispatchers should be thoroughly familiar with their Agency's Aviation Operation Plans
15 to facilitate efficient and safe dispatch of aircraft.

16
17 For Helicopters, sterile cockpit also occurs after the helicopter pilot has made radio
18 contact with ground personnel for current ground conditions prior to landing or initiating
19 mission operations. There should be no talking in the aircraft during takeoff and /or
20 landing unless the pilot requests input on clearance or hazards.

22 **Flight Manager**

23 (Refer to NMG 20)

25 **Aircraft Flight Request/Schedule Form:**

26 The DOI Flight Request/Schedule Form (**Form 9400-1a May 1993**) has been adopted
27 as the national interagency standard dispatch form for all point-to-point flights. The
28 completed form will be forwarded to all the affected parties. This form should be filled
29 out accurately and thoroughly, as it contains critical information that may be needed in
30 emergency situations. (# of passengers, pilot name(s) and contact #, color of a/c, etc.)
31 As a reminder, do not count the pilot as a passenger in the passenger block.

33 **Types of Flights**

34 **Point-to-Point:** Point-to-Point flights originate at one developed airport or permanent
35 helibase, with a direct flight to another developed airport or permanent helibase. These
36 types of flights are sometimes referred to as "administrative" flights. The pilot and
37 aircraft must be agency-approved (carded) for these point-to-point flights.

38
39 A point-to-point flight is conducted higher than 500 feet above ground level (AGL)
40 except for takeoff and landing. Flight following and tracking is normally accomplished
41 via an FAA Flight Plan, (Visual Flight Rules-VFR or Instrument Flight Rules-IFR) filed
42 by the pilot, along with the 9400-1a form, and follow-up phone calls to the appropriate
43 dispatch center when flights commence and/or terminate. Pre-positioning of tactical
44 aircraft falls into this category.

1 **Mission Flights:** Mission flights are flights that do not meet the definition of a point-to-
2 point flight. These types of flights are often referred to as “tactical” flights.

3
4 A mission flight requires work to be performed in the air, such as retardant or water
5 delivery, fire reconnaissance, smokejumper delivery, sketch mapping, or through a
6 combination of ground and aerial work, such as delivery of personnel and/or cargo from
7 helibases to helispots or unimproved, undeveloped landing areas, rappelling or cargo let-
8 down; horse herding, insect and disease detection flights, infrared mapping, GIS mapping
9 or orthophoto flights.

10
11 Some mission flights require the use of personal protective equipment (PPE) and some
12 are performed below 500 feet above ground.

13
14 The pilot and aircraft must be agency-approved (carded) for the mission being performed.

15
16 Flight following and tracking is normally accomplished via AFF and through “ops
17 normal” radio transmissions to dispatch or qualified incident personnel (i.e. Air Attack
18 Group Supervisor (ATGS), Air Base Radio Operator (ABRO), Helicopter Coordinator
19 (HLCO), etc.) on an approved/predetermined interval (normally 15 minutes).

20
21 Mission flights must be conducted according to the requirements and parameters of the
22 specific local agencies Unit and State/Regional Aviation Management Plans, which could
23 include Project Aviation Safety Plans (PASP) as needed.

24 25 **Flight Plans and Flight Following**

26 The intent of this section is to ensure that adequate flight following is maintained
27 throughout the flight so that appropriate action can be taken in the event of a mishap.
28 Flight following must be properly established and consistently maintained at all times to
29 be of any value to any user.

30
31 Agency flight plans are the responsibility of the originating dispatch office and
32 documented on a Flight Request/Flight Schedule or an Aircraft Resource Order for
33 mission flights. Flight Following is the responsibility of the originating dispatch office
34 and will remain so until transferred through a documented, positive handoff. Flight
35 following may require coordination with adjoining dispatch centers in the flight path. If
36 the NICC/RMACC is providing flight following for aircraft traveling across country, a
37 flight plan should be forwarded on to the dispatch centers that may be involved, in the
38 event they need to assist in search procedures for overdue aircraft.

39
40 The flight following dispatch office shall be continually staffed while an aircraft is
41 airborne during tactical or mission resource flights. Confirmation of an aircraft’s arrival
42 at a specified destination is required to ensure that a flight has been completed safely. It
43 is the pilot’s responsibility to close out a flight plan. If an aircraft is overdue, it is the
44 receiving dispatcher’s responsibility to initiate aircraft search and rescue actions. Flight
45 Following problems are documented through the SAFECOM system.

1 **FAA Flight Plans and Flight Following**

2 All flights conducted under FAA Instrument Flight Rules (IFR) are automatically
3 provided FAA flight following. Administrative flights conducted under Visual Flight
4 Rules (VFR) flight plans require the pilot to file a flight plan with the appropriate FAA
5 facility. The pilot must request FAA flight following. Air Traffic Control (ATC) may or
6 may not provide it. It is the pilot's responsibility to confirm with dispatch which type of
7 FAA flight plan/flight following will be used. The pilot will close out the flight plan with
8 the FAA once the flight is completed.

9
10 FAA flight plans and flight following are generally used for point-to-point flights and the
11 pilot or flight manager will contact the originating dispatch center with an estimated time
12 of departure (ETD), estimated time enroute (ETE) and will close out with the designated
13 dispatch center with the actual time of arrival (ATA) to accomplish resource tracking.

14 **Agency Flight Following**

15 For mission flights, there are two types of Agency flight following: Automated Flight
16 Following (AFF), and Radio Check-in.

17
18
19 **AFF** is the preferred method of agency flight following, and will include an initial Radio
20 Check-in. If the aircraft and flight following office have AFF capability, it will be
21 utilized. Periodic radio transmissions are acceptable when utilizing AFF.

22
23 **Radio Check-in Flight Following** requires verbal communication via radio every 15
24 minutes. The dispatcher will log the aircraft call sign, latitude, longitude, and heading.
25 Agency flight following is used for all mission flights. Helicopters conducting Mission
26 Flights shall check-in prior to and immediately after each takeoff/landing per Interagency
27 Helicopter Operations Guide (IHOG) 4.II.E.2.

28
29 For point-to-point flights, AFF flight following may be used as well. The pilot or flight
30 manager will, at a minimum, contact dispatch prior to the flight with an ETD, ETE, fuel
31 on board (FOB), souls on board (SOB), and will close out with dispatch once the aircraft
32 is on the ground.

33
34 Flights that are to be conducted at low level or in areas where radio communications are
35 inadequate are expected to notify the monitoring station of their location, intentions, and
36 when to expect the next check-in. In these instances, a flight may not be out of radio
37 contact for more than thirty minutes. Pilots will monitor assigned frequencies at all times.
38 Pilots must notify dispatch when they have established positive communications with an
39 incident and are switching to incident flight following.

40
41 When airtankers, lead planes, smokejumper aircraft, and helicopters establish two-way
42 radio communications with an Air Tactical Group Supervisor (ATGS), they generally
43 transfer their flight following to the ATGS. ATGSs are expected to be able to give status
44 reports on all aircraft under their control. Once released by the ATGS, pilots must resume
45 flight following with dispatch with a positive hand off. This should be well documented.

Responsibilities of the pilot include the following:

- Flight following on a 15-minute check-in interval if AFF is unable to be used. The dispatcher is required to record the information and in the event that a check-in is not received, an attempt to contact the pilot on the appropriate frequency will continue. In the event that two-way radio communications cannot be reestablished, the dispatcher will initiate the initial phase of the Interagency Aviation Mishap Response Guide.
- The following information should be provided and documented for flight following:
 - Time of check-in
 - Current position of aircraft (lat/long, geographical landmarks, etc.)
 - Direction of travel (unless orbiting or consistently working in one area)
 - Any changes in flight plan or status
- For Special Use missions outside of fire suppression and before any flight is initiated, the dispatcher should have a full understanding of the purpose of the mission, destination, expected duration, identity of passengers, type and quantity of cargo, check-in intervals, communications plan, and the crash rescue plan. (This is accomplished by providing the dispatch center with a copy of the Project Aviation Safety Plan (PASP) and/or the inclusion of dispatch in the pre-mission briefing.)
- Two-way radio communications and/or automated flight following must be maintained with all aircraft, which the dispatcher has agreed to flight follow, throughout the duration of the flight. See AFF requirements below.

National Resource Tracking / Flight Following: 800-994-6312

RMA Resource Tracking / Flight Following: 800-494-2073

Automated Flight Following (AFF) Requirements & Procedures

AFF does not eliminate the requirement for the pilot/flight manager to coordinate flight following with the scheduling dispatch office. Preflight communications should always be made and the appropriate flight following procedures agreed upon between pilot and dispatch.

Pilots must monitor at least one predetermined radio frequency as an alternate means of flight following in the event the AFF system fails in the aircraft or in dispatch, or in case dispatch needs to cancel a mission, divert that aircraft to a higher priority incident, or relay other critical information regarding hazardous weather, new Temporary Flight Restrictions (TFRs), etc.

Additional information about AFF can be found at: <https://www.aff.gov/>.

Aircraft Accident/Incident Reporting

Refer to current local unit emergency procedures.

Overdue and Missing Aircraft

If an aircraft fails to arrive at its destination or fails to check-in on the prescribed interval, initiate the Interagency Aviation Mishap Response Guide.

Forest Service Owned/Leased Aircraft

Costs

Aircraft	Call Sign	Flight Rate/Hour	FOR/Day	Speed
Cessna 206	N126Z	*\$338.00	*\$50.00/day	130 knots/hr.
King Air 90GT	N64GT	*\$652.00	N/A	250 knots/hr.

*Rates are subject to change.

Fixed Operating Rate (FOR) is charged for all non-Forest Service Administrative flights with the C-206.

All FOR charges are on a whole day basis unless they are split among multiple users on that day. Pilot overtime will be charged to the customer's job code if the duration of the pilot's normal duty day is exceeded due to customer's scheduling.

The King Air is an Exclusive Use contracted resource and does not have FOR fees. Additionally, the daily availability is paid by the WO so only the hourly rate applies.

Use and Capabilities

Make/Model	C-206	King Air 90GT
Use	Recon, Transport, Photo, Air Attack	Recon, Passenger Transport, Air Attack, Lead/ASM
Fuel Type	Avgas	Jet-A
Range (w/reserve)	3.5 Hours	4.5 hours
Max. Take-off Weight	3,600	10,100
Runway	Hard surface 2,000 ft. min.	3,000
Passengers	4-5	6
Baggage	120 lbs	Depends on # of pax
Ground Power Unit (less than 500/100 AMPs)	Not Required	Not Required

1 State Owned Aircraft

3 Colorado Division of Fire Prevention and Control (DFPC)

5 Multi-Mission Aircraft (MMA)

6 The Colorado Multi-Mission Aircraft (MMA) generally operate under FAA flight plans
7 and FAA flight following. They have T1 Avionic capabilities and are active on AFF so
8 can be agency flight followed if necessary. Aircraft and pilots are interagency carded.

10 Use and Capabilities

Make/Model	Pilatus PC-12
Call Signs	N327SF & N328SF
Use	Recon, Photo, EO/IR, Detection
Fuel Type	Jet-A
Range (w/reserve)	5 Hours
Max. Take-off Weight	9920 lbs.
Runway* (accelerate-stop distance)	*4700'
Passengers	5
Baggage	Depends on # of pax
Ground Power Unit (less than 500/100 AMPs)	Not Required
Avionics Typing	1
Cruise Speed	250 knots/hr

11 *Varies with temperature and altitude.

12 The above listed runway distance reflects 5500' MSL at 30C and 9500 lbs.

14 Colorado Multi-Mission Aircraft are requested in the following manner:

- 16 1. For all requests for **in-Colorado-state** reconnaissance, orthophoto, EO/IR, and/or
17 detection flights:
 - 18 • For State, County, Fire Department and other non-federal agencies: MMA
19 requests shall be placed to the Denver Regional Colorado State Patrol
20 (CSP) Dispatch.
 - 21 • For Federal agencies located within Colorado State: MMA requests shall
22 initially be placed to the local Colorado Interagency Dispatch Center, who
23 will then place the order to the Denver Regional Colorado State Patrol
24 (CSP) Dispatch.

26 Contact CSP Dispatch via the State Emergency Operations Line (303-279-8855).
27 Request to order the DFPC MMA and ask to speak to the DFPC Duty Officer.

1 Orders are to include information on the current DFPC MMA Request Form (see
 2 RMG chapter 80 or available for download on the Colorado Division of
 3 Homeland Security & Emergency Management (DHSEM) web portal:
 4 <http://www.dhsem.state.co.us/> under the Colorado Daily Status Report Link or
 5 <https://drive.google.com/file/d/0Bw8vQErntSe8aUc2Yjd6S0RoeWs/view>).
 6 A ROSS resource order is not needed.

- 7
- 8 2. For all requests for **in-Colorado-state large fire** reconnaissance, orthophoto,
 9 EO/IR, and/or detection flights:
- 10 • A MMA request shall be created in ROSS and placed to the RMACC from
 11 the local Colorado Interagency Dispatch Center.
- 12
- 13 3. For all requests for **out-of-Colorado-state** reconnaissance, orthophoto, EO/IR,
 14 and/or detection flights including initial attack or large fire support:
- 15 • A MMA request shall be created in ROSS and placed to the RMACC using
 16 the standard dispatching system.
- 17

18 The RMACC will coordinate with the DFPC Duty Officer as needed. If a MMA
 19 resource is assigned, the RMACC will fill the ROSS order and create a flight strip
 20 to send to the requesting Dispatch Center using the standard dispatching system.

21 **Costs**

22 There is no cost to in-Colorado-state agencies for flights unless assigned to a Colorado
 23 large fire.
 24

25 Assignments to large fire support and out-of-state resource orders will incur flight time
 26 and daily availability charges as follows:
 27

28 Aircraft	29 Flight Rate/Hour	30 Daily Availability
31 Colorado MMA	32 *\$1500	33 **\$3300

34 *Rates are subject to change. Rates include pilot, a mission system operator (MSO), and
 35 near-real time access to all products through the Colorado Wildfire Information
 36 Management System (CO-WIMS) portal.

37 **Daily Availability for 12 hours applies to out-of-state commitments and Colorado large
 38 fires.
 39
 40

1 **South Dakota State Aviation Resources (SDS)**

2 State of South Dakota Department of Transportation (DOT) occasionally has 2 King Air
3 90s available for interagency use under cooperative fire agreements through the South
4 Dakota Division of Wildland Fire, provided an interagency letter of approval has been
5 issued. However, the use of these aircraft is primarily restricted within South Dakota and
6 neighboring states or within the Great Plains Interstate Fire Compact member states.

7
8 The State of South Dakota DOT King Air 90s are ordered through the Great Plains
9 Interagency Dispatch Center. The aircraft are based out of Pierre, SD and may be
10 repositioned as needed during local fire activity.

11 **Costs**

Aircraft	Call Sign	Flight Rate/Hour	Daily Availability	F.O.R. per Day	Cruise Speed
Beechcraft KA-C90A	N90SD	*\$1500	\$1000	No Standby	240 knots/hr.
Beechcraft KA-C90A	N773SD	*\$1500	\$1000	No Standby	240 knots/hr.

13 *Rates are subject to change.

14 **Use and Capabilities**

Make/Model	Beechcraft KA-90C
Use	Air Attack, Passenger Transport, Recon
Fuel Type	Jet-A
Range (w/reserve)	5 Hours
Max. Take-off Weight	10,100 lbs.
Runway (accelerate-stop distance)	*5,600' @ max. takeoff weight/5,500' @ MSL @ 30 C
Single Engine Rate of Climb	253' per minute @ max. take-off weight @ 20 C
Single Engine Service Ceiling	*8,800' @ max. weight @ 20 C
Ground Power Unit (less than 500/100 AMPs)	Not Required
Avionics Typing	1

16 *Varies with weight, temperature and altitude.

1 **Vendor Fixed-Wing Aircraft**

2 **USFS Approved Vendors**

3 USFS Region 2 CWN contracts have been awarded for the procurement of tactical,
4 reconnaissance, cargo and passenger fixed-wing aircraft. Contact the RMACC Aircraft
5 desk for information.
6

7 **DOI/OAS Approved Vendors**

8 A listing of DOI/OAS approved vendors, aircraft, and pilots can be found at the following
9 website: <https://doi.gov/aviation/> and is only available to DOI employees. A link to this
10 site is available through the Aviation link on the RMACC web page.
11

12
13 Reference the appropriate On Call Air Tactical Fixed Wing Contract or Aircraft Rental
14 Agreement (ARA) when contacting vendors for fixed-wing aircraft procurement. ARA
15 agreements are not authorized for fire orders for more than one day. ARA contracts can
16 be used for reconnaissance as long as it is under \$25,000.
17

18 Contracted aircraft are inspected and carded by the Office of Aviation Services (OAS)
19 and/or the United States Forest Service (USFS). They are available for interagency use
20 and will be requested through established ordering channels.
21

22 Documentation in ROSS at the time of hire must include which contract the aircraft is
23 hired under, i.e. USFS Region 2 CWN or DOI On Call as well as be communicated with
24 the vendor hiring official/pilot and flight manager.
25

26 **Smokejumper Initial Attack Ordering**

27 (Refer to NMG 20, 50; RMG 20)

28 When smokejumpers are needed jump-ready for initial attack with aircraft, they are to be
29 requested in ROSS as “Load, Smokejumper, Initial Attack” on an Aircraft request. The
30 sending unit will fill the request in ROSS and will forward a manifest form, with name
31 and agency identification, through the established ordering channels. This information
32 can be acquired after the jump ship is airborne. Any intent to retain smokejumpers which
33 have not been utilized as an IA load will be negotiated between the RMACC and the
34 NICC.
35

36 If the RMACC pre-positions smokejumpers when multiple starts are occurring or
37 predicted, they need to specify the anticipated duration. If not deployed during this
38 period, smokejumpers will be made available for higher priorities, unless longer duration
39 is negotiated between the RMACC and the NICC. This will be identified in special needs
40 as “Preposition”.
41

42 Aircraft delivering Initial Attack smokejumpers will return to the sending base or a
43 designated airport before the end of the pilot’s daily flight or duty limitations. Any intent
44 or necessity to retain the aircraft will be negotiated between the NICC and the RMACC.
45 If the aircraft is retained past the first operational period, it will be placed on an Aircraft
46 request through established ordering channels.
47

Ordering Considerations for Initial Attack Smokejumpers which should be noted in Special Needs:

- Order as soon as possible, for full effectiveness.
- Reference the “Ordering Tactical Aircraft” section in the first part of this chapter for minimum information required on a tactical resource order in the RMA.
- Per both BLM and USFS Smokejumper User Guides, smokejumpers can be launched with incident information covering the general location and location coordinates, frequencies, and any other known hazards such as other responding aircraft. All other information can be received enroute to expedite response times.
- Elevation of fire, if known.
- Is the fire in a designated Wilderness Area?

Smokejumper Aircraft

(Refer to NMG 50)

Lead Planes

(Refer to NMG 50)

Lead Planes are national initial attack resources. They are ordered through normal dispatch channels and can be diverted to a higher priority incident.

The IC and/or the tactical pilot has the discretion to request a Lead Plane/Aerial Supervision Module (ASM) anytime they deem it necessary to evaluate drops in difficult terrain prior to requesting an airtanker, etc. If needed to go below 500 feet, a lead plane must be ordered.

(Refer to the RMA Aerial Supervision Requirements Chart found in this chapter)

Not all Lead Plane pilots are MAFFS and/or VLAT qualified.

Refer to <http://www.nifc.gov/nicc/logistics/aviation/aviation.htm> for a detailed list.

Lead Plane call signs initiate with “Lead”. Example: L-28 = Lead Two Eight
Lead Planes should always be filled with a roster in ROSS.

Aerial Supervision Modules (ASM)

(Refer to NMG 50)

An ASM is a two person crew functioning as the Lead and ATGS (Air Tactical Group Supervisor) on the same aircraft. The ASM crew is qualified in their respective positions and has received additional training and authorization. An ASM can perform the functions of a low-level Lead Plane operation, traditional Air Attack, or both, depending on the needs of incident management personnel.

An ASM consists of an Air Tactical Pilot (ATP) and Air Tactical Supervisor (ATS).

Air Tactical Pilot: The ATP is a qualified Lead Plane pilot who has received specialized training and authorization to function as an ASM crewmember. The ATP functions as the Lead Plane pilot and utilizes Crew Resource Management (CRM) skills to evaluate and share the incident workload with the ATS.

Air Tactical Supervisor: The ATS is a qualified ATGS who has received specialized training and authorization to function as an ASM crewmember. The ATS is an ATGS who also utilizes CRM to evaluate and share the incident workload with the ATP.

Not all ASM pilots are MAFFS/VLAT qualified.

Refer to <http://www.nifc.gov/nicc/logistics/aviation/aviation.htm> for a detailed list.

Call signs for ASMs initiate with “Bravo”. Example: B-28 = Bravo Two Eight.

ASMs should always be filled with a roster in ROSS.

Ordering Considerations for Lead Planes/ASM which should be noted in Special Needs:

- Launch timeframe considerations
 - Arriving at incident before airtanker, especially for Next Generation airtankers.
- MAFFS - qualified LP required
- VLAT - qualified LP required

Aerial Supervision Requirements in the RMA

When aerial supervision resources are co-located with retardant aircraft, they should be launched together on the initial order to maximize safety, effectiveness, and efficiency of incident operations. Incidents with 3 or more aircraft over/assigned to them should have aerial supervision over/assigned on the incident. Federal policy dictates additional requirements as listed below.

Situation	Lead Plane/ASM	See Ref.	ATGS	See Ref.
Airtanker not IA rated	Required	1,4	--	-
MAFFS	MAFFS Endorsed Lead/ASM required	1,4	--	-
VLAT	VLAT Endorsed Lead/ASM required	1	--	-
When requested by airtanker, ATGS, LP, ATCO or ASM	Required	1	Required	1
Foreign Government Airtankers	Required if ATGS is not on scene	1	Required if no Lead/ATCO/ASM	1
Multi-engine Airtanker: Retardant drops conducted between 30 minutes prior to, and 30 minutes after sunrise, or 30 minutes prior to sunset to 30 minutes after sunset.	Required if ATGS is not on scene	1,2	Required if Lead/ATCO/ASM is not on scene	1,2
Single Engine Airtanker (SEAT) SEATS are required to be “on the ground” by ½ hour after sunset.	See Level 2 SEAT requirements	1	See Level 2 SEAT requirements	1

Continued next page

Level 2 rated SEAT operating over an incident with more than one other tactical aircraft on scene. SEATS are required to be “on the ground” by ½ hour after sunset.	Required if ATGS is not on scene	1	Required if Lead/ATCO/ASM is not on scene	1
Retardant drops in congested/urban interface areas	Order	1,3,4	May use if Lead/ATCO/ASM not on scene	
Periods of marginal weather, poor visibility or turbulence	Required	1	Order	1
Three or more airtankers assigned to an incident	Required		Must be ordered if Lead/ASM is not available	1
Two or more helicopters with two or more airtankers over an incident	Required		Must be ordered if Lead/ASM is not available	1
Two or more air tankers over an incident or at staggered intervals of 15 min or less.	Required		Must be ordered if Lead/ASM is not available	4
Presence of smokejumper or paracargo aircraft with two or more airtankers over an incident	Required		Must be ordered if Lead/ASM is not available	1,5
Incident has two or more branches			Must be ordered	1,5

1
2 **References: (1-5 from Aerial Supervision Table)**

- 3 1. Interagency Aerial Supervision Guide
4 2. Requires determination by either the ATGS or Lead Plane that visibility and
5 safety factors are suitable for retardant operations and dispatch has been notified
6 of this determination.
7 3. Required under Exemption 392 from 14 CFR Part 91.119, FSM 5714.11 for USFS
8 jurisdiction. Incidents under BLM jurisdiction require a lead plane to be on order.
9 4. FSM 5716.32 (differs from DOI policy)
10 5. FSM 5716.32 classifies these missions as complex. An ASM, Lead Plane, or
11 HLCO should be ordered as appropriate in addition to the ATGS.
12
13

Definitions of Key Aerial Supervision Terms:

Required: Aerial supervisory resource(s) are to be over the incident when specified air tactical operations are being conducted.

Ordered: Aerial supervisory resources are to be ordered by the controlling entity. (Air tactical operations may be continued while the aerial supervision resource is enroute to the incident. Operations can be continued if the resource is not available.)

Over: The air tactical resource is flying above or is in a holding pattern adjacent to the incident.

Assigned: Tactical resource allocated to an incident. The resource may be flying enroute to and from, or on hold at a ground site.

Ordering Considerations for Aerial Supervision and other Fixed Wing:

- Aerial supervision resources will be dispatched, when available, for initial and extended attack to enhance efficiency and safety of ground and aerial operations.
- Communication and coordination is critical to the efficient use of aerial supervision resources due to faster mobilization of new generation aircraft.
- Oxygen requirements – Flights using call when needed (CWN) vendors must comply with FAA regulations they operate under.
 - **Part 135 – 14 CFR Part 135.89:** Supplemental oxygen must be available and used by the flight crew at cabin pressure altitudes above 10,000 feet (MSL) for that portion of the flight more than 30 minutes duration. At cabin pressure altitudes above 12,000 feet (MSL) the flight crew (including aerial supervisors) must use supplemental oxygen during the entire flight.
 - **Part 91.211:** Supplemental oxygen must be available and used by the flight crew at cabin pressure altitudes above 12,500 feet (MSL) for that portion of the flight more than 30 minutes duration. At cabin pressure altitudes above 14,000 feet (MSL) the flight crew (including aerial supervisors) must use supplemental oxygen during the entire flight. At cabin pressure altitudes above 15,000 feet (MSL) all passengers must have supplemental oxygen available during the entire flight.
- **Flight Condition Guidelines** – Aerial Supervision personnel must carefully evaluate flight hazards, conditions (visibility, wind, thunder cells, turbulence, and terrain) to ensure that operations can be conducted in a safe and effective manner. The following policies and guidelines are designed to do this:
 - **Visibility** – Regardless of time of day, when poor visibility precludes safe operations, flights will be suspended. It is recommended that incident aircraft fly with landing and strobe lights on at all times. It is required that lead planes fly with landing/impulse and strobe lights on at all times. Regular position reporting is critical in marginal visibility conditions.
 - **Wind Conditions** – Moderate to high winds and turbulent conditions affect flight safety and water/retardant drop effectiveness. The following guidelines should be considered in making the decision to continue or suspend operations. A number of factors including terrain, fuel type, target location, resources at risk, cross-winds, etc. must be considered.

- 1 ▪ **Heavy Airtanker Drops:**
- 2 • Generally ineffective in winds over 20-25 kts. (23-29 mph)
- 3 ▪ **SEAT Operations**
- 4 • Generally ineffective in wind over 15-20 kts. (17-23 mph)
- 5 Operations shall be suspended when sustained winds are 30
- 6 kts. (34 mph) or the gust spread is 15 kts. (17 mph)
- 7 ▪ **Helicopter Drops**
- 8 • Generally ineffective in winds over 25-30 kts. (29-34 mph)
- 9

10 **Tactical and Reconnaissance Aircraft**

11 Documentation in ROSS at the time of hire must include which contract the aircraft is
12 hired under, i.e. USFS Region 2 CWN or DOI On Call, as well as be communicated with
13 the vendor hiring official/pilot and flight manager.

14
15 A copy of the resource order should be shared with the ATGS, pilot and/or company point
16 of contact.

17
18 Cost, aircraft performance, configuration, and incident location will be considered when
19 filling orders.

20 **Ordering Considerations for Air Attack which should be noted in Special Needs:**

- 21 • Turbo/Turbine powered
- 22 • Operating Altitude
- 23 • Pressurized vs non-pressurized
- 24 • Avionics Type (NMG 50)
- 25 • High wing/Low wing
- 26 • When using CWN aircraft, ATGS and aircraft will be brought together at a pre-
27 designated airport/ATB/FBO (Fixed Base Operator) prior to arrival at the
28 incident.
- 29 • Will Trainee be used (could affect performance)
- 30 • Identify ATGS in special needs/documentation if known, with contact info.
- 31 • ATGS – evaluate situation to determine if agency vehicle will be provided or if
32 rental car is needed and/or authorized.
- 33
- 34
- 35
- 36

1 **Airtankers**

2 (Refer to NMG 50)

3 The RMACC/Dispatch Centers shall retain control of air tankers during incidents and
4 have authority to divert airtanker(s) to initial attack situations based on threat to life,
5 property, or resource values. Incidents affected by diversions must be informed by the local
6 Dispatch Center. Critical items listed earlier under Ordering Tactical Aircraft must be
7 provided as well as for any diversions from the original order.

8
9 There are five (5) types of airtankers:

10	<u>Type</u>	<u>Capacity (Minimum)</u>
11	VLAT	8,000 gallons or more (VLAT=Very Large Airtanker)
12	1	3,000 to 7,999 gallons
13	2	1,800 to 2,999 gallons
14	3	800 to 1,799 gallons
15	4	Up to 799 gallons

16
17 When the RMACC has depleted available large airtanker (Types 1, 2 & VLAT) resources,
18 request(s) will be placed with the NICC. Large airtanker initial attack agreements
19 between neighboring unit level dispatch centers are valid only where proximity allows
20 the airtanker to respond loaded direct to the incident.

21
22 The NICC will prioritize and allocate federal airtankers by positioning them in areas of
23 current or predicted high wildfire danger or activity.

24 **Ordering Considerations for Airtankers which should be noted in Special Needs:**

- 25 • Values at Risk (see RMG 10)
- 26 • Distance from the fire and anticipated timeframes to the Values at Risk based on
- 27 current and expected weather.
- 28 • Loaded or Empty – 2 hour maximum flight when loaded, except for the VLATs
- 29 • Reload Base
- 30 • Is the reload base approved for VLAT or MAFFS?
- 31 • Lead Plane/ASM is required for VLAT and MAFFS

32
33
34 *FYI- An order for an airtanker may be filled by a VLAT due to ATB rotation. However
35 this will not occur without dialogue between the NICC, RMACC and the ordering unit.
36 Documentation and dialogue will be critical for a positive outcome in these scenarios,
37 especially if the ordering unit is not able (financially) or willing (terrain issues) to accept
38 a VLAT.*

39 **Airtanker Management**

40 To ensure consistent utilization, rotation and management of the national airtanker fleet,
41 please refer to PMS 508 Interagency Airtanker Base Operations Guide, PMS 506
42 Interagency SEAT Operations Guide (ISOG), and supplemental direction provided in
43 NMAC correspondence #2015-4 or superseding NMAC correspondence.

Airtanker Dispatch Limitations - Startup/Cutoff Times

To reduce the hazards encountered by pilots operating in low light conditions over the fire, airtanker retardant drops in the early morning and late evening hours must comply with the following limitations. These limitations apply to the time the aircraft arrives over the fire, not to the time the aircraft is dispatched.

(Refer to the Interagency Airtanker Base Operations Guide, Chapter IV)

Limitations on Startup and Cutoff Time: Multi-engine airtankers shall be dispatched to arrive over a fire (with no aerial supervision on scene) not earlier than 30 minutes after official sunrise and not later than 30 minutes before official sunset. These times are termed the “startup” and “cutoff” times respectively.

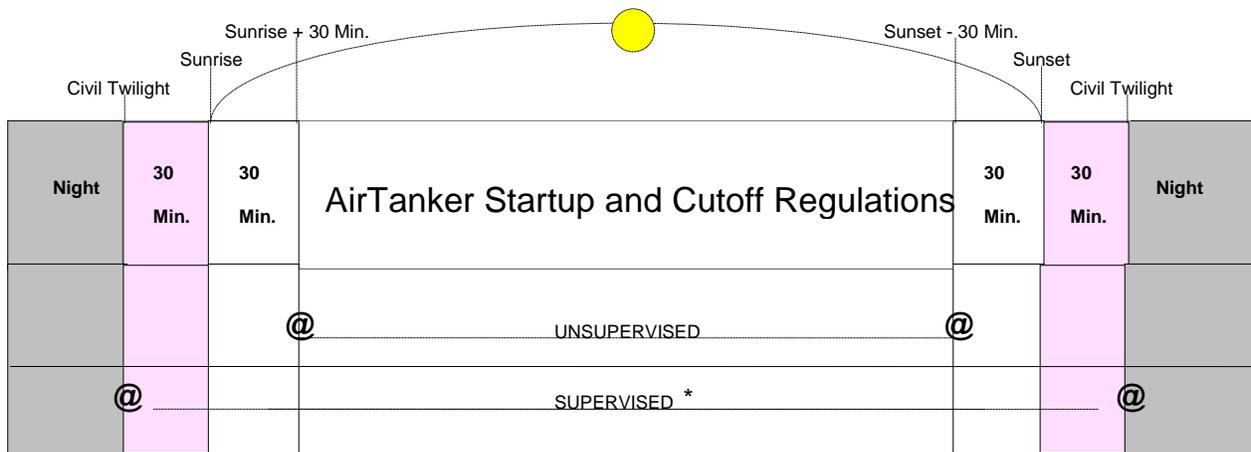
Exception: With a qualified Air Tactical Group Supervisor, ASM or Lead Plane, airtankers may be dispatched to arrive over a fire as early as 30 minutes **prior to** official sunrise and as late as 30 minutes **after** official sunset provided:

- Lead plane, ATGS, or ASM is on scene.
- It has been determined that visibility and other safety factors are suitable for dropping retardant; and
- Notification to the appropriate dispatcher of this determination.

Determination of Official Sunrise, Startup, Cutoff, and Sunset Time:

Each airtanker base and dispatch office shall have tables showing the official sunrise, startup, cutoff, and sunset times at those locations.

Determinations for Airtanker Dispatch: Use the official sunrise, startup, cutoff, and sunset times of the airtanker base nearest the fire and comply with the limitations in the preceding paragraphs 1 and 2.



@ = Arrival Over The Fire (No earlier in the morning or later than in the evening)

* = SUPERVISED (Defined as Airtanker Coordinator or Air Tactical Group Supervisor)

Note: Sunrise and Sunset are determined by the Official Sunrise and Sunset Tables of the nearest reload base.

31
32
33

For further information, refer to the Interagency Aerial Supervision Guide (IASG), BLM Handbook H-9400-2 IV.U.3, FSH 5709.11-41 and the Interagency Single Engine Airtanker Operations Guide (ISOG) Ch. 3, II, E.

Airtanker Use in Optional and Post Season Periods

(Refer to NMG 50)

RMA Air Tanker Bases (ATB) / Reload Bases

<u>Airport</u>	<u>Name</u>	<u>Dispatch Center/Hosting Agency</u>	
DRO	Durango ATB	DRC/USFS	Full Service Contract
BJC	Jeffco ATB	FTC/USFS	Force Account
GJT	Grand Junction ATB	GJC/BLM	Full Service Contract
RAP	Rapid City ATB	GPC/USFS	Full Service Contract

PUB	Pueblo Reload Base	PBC/USFS	Permanent
CPR	Casper Reload Base	CPC/BLM	Temporary

(CPR requires activation /ordering of a portable retardant base)

RMA VLAT Approved Airports

<u>Airport</u>	<u>Name</u>	<u>Dispatch Center/Hosting Agency</u>
CPR	Casper, WY	Current agreement good through 2016
PUB	Pueblo, CO	Updated agreement needed annually.

For information regarding airtanker capabilities, see the Interagency Airtanker Base Directory (IATB PMS 507/NFES 002537).

Modular Airborne Firefighting Systems (MAFFS)

(Refer to NMG 50)

MAFFS Airlift Wings in the RMA

Peterson Air Force Base, CO	COS	Federal-Air National Reserve	2 C-130
Cheyenne, WY	CYS	State-Air National Guard	2 C-130

State Activation of MAFFS units:

The State of Wyoming has an agreement between the Governor and the Wyoming Air National Guard MAFFS unit, which allows activation of the Cheyenne unit. Orders will be placed through established dispatch channels, and notification made to the RMACC and the NICC.

National Activation of MAFFS units:

- The RMACC will ensure that all commercial airtankers in the RMA are committed to fires or pledged to initial attack needs before placing the order with the NICC. The NICC will advise the RMACC if MAFFS activation is warranted or if the request can be filled with a contract tanker. If MAFFS are activated, the RMACC will deal directly with the MAFFS liaison officer as directed by the NICC.
- Refer to the MAFFS Operating Plan for further information regarding MAFFS operations.

1
2 Colorado Springs is a MAFFS unit under the operational control of the United States Air
3 Force National Reserves and requires National activation.

4
5 **MAFFS Approved Reload Bases in the RMA**

6 DRO	Durango ATB	DRC/USFS
7 BJC	Jeffco ATB	FTC/USFS
8 GJT	Grand Junction ATB	GJC/BLM
9 RAP	Rapid City ATB	GPC/USFS
10 PUB	Pueblo Reload Base	PBC/USFS

11
12 **Water Scoopers**

13 (Refer to NMG 50)

14
15 **Single Engine Airtankers (SEATs)**

16 (Refer to NMG 50)

17 For general guidelines about SEATs, see the current edition of the Interagency Single
18 Engine Airtanker Operations Guide (ISOG - NFES #1844) published every three years.
19 For operations in the RMA, refer to the Interagency SEAT Operations Plans available per
20 state.

21
22 **SEAT Typing**

23 Because of the growing number of SEATs that qualify as Type 3 airtankers, the
24 numbering system for SEATs will be as follows:

25
26 Aviation managers will coordinate any administrative movement of SEATs with the
27 RMACC and affected dispatch centers.

28
29 All SEATs that qualify as Type 3 SEATs will be issued airtanker designation numbers
30 and call signs starting at 800 and ending with 899.

31
32 All SEATs that qualify as Type 4 SEATs will continue to be issued airtanker designation
33 numbers and call signs starting at 400 and ending with 499.

34
35 Requests for Federal or State approved SEATs will be through normal channels. SEATs
36 can be utilized for initial attack. There are occasions when single engine airtankers can
37 be used more safely than large airtankers due to terrain. The Incident Commander or
38 aerial supervisor should determine this utilization.

39
40 A SEAT Manager (SEMG) will be assigned at all times. Exclusive Use SEATs will not
41 necessarily come with a SEMG and one should be ordered if needed. A SEMG should
42 be ordered separately for CWN SEATs.

43
44 When operating in a congested area under USFS jurisdiction and hire, SEATs must
45 operate in accordance with USFS Grant of Exemption #392 which requires Lead
46 Plane/Airtanker Coordinator/ATGS on scene and implementation of a Temporary Flight
47 Restriction (FAR 91.137).

1 When operating in a congested area under BLM jurisdiction and hire, SEATs must
 2 operate in accordance with FAR Part 91.119(b) and FAR Part 137.51 and 137.53 for
 3 General Aviation and dispensing of chemicals.

4
 5 SEATs are required to be “on the ground” by 1/2 hour after sunset.

6
 7 **Ordering considerations for SEATs which should be noted in Special Needs:**

- 8  8 • Operating Altitude
 9 • Operating Temperature
 10 • Reload Base
 11 • Is Support Truck needed?
 12 • Is there a SEMG in place?
 13 • Values at Risk
 14 • Distance from the fire and anticipated timeframes to the Values at Risk based on
 15 current and expected weather

16
 17 **BLM – Colorado/Wyoming (CSO/WSO) SEATs**

18 The DOI will host exclusive use SEATs nationally, and will be moved as requested
 19 through the ROSS ordering system.

20
 21 BLM (Colorado and Wyoming), may be requesting On-Call SEAT contracts for up to 90
 22 days in coordination with the BLM National Aviation Office. These start dates will be
 23 based on current or expected fire activity. The hosting base will be determined at that
 24 time. It is expected that the Federal SEATs will move with fire activity.

25
 26 **Colorado Division of Fire Prevention and Control (DFPC) SEATS**

27 The Division of Fire Prevention and Control has an annual Exclusive Use SEAT contract.
 28 This contract may be for up to four SEATs. The start date is determined by fire activity,
 29 generally an April timeframe. Contact CO DFPC Aviation Unit Chief.

30
 31 **State of South Dakota (SDS) SEATS**

32 SDS may host up to 4 SEATs during fire season. These SEATs are contracted directly
 33 with the state of South Dakota on a CWN basis usually starting July 1st. All SDS
 34 contracted SEAT aircraft are required to hold a current “interagency fire” aircraft card,
 35 and all pilots of the SDS contracted SEATs will possess a current “interagency fire” pilot
 36 card for the make/model flown.

37
 38 All SDS Contracted SEATs are required to hold a current National DOI On-Call SEAT
 39 contract, as well as the state of South Dakota SEAT contract. All SDS contracted SEATs
 40 are mobilized through Great Plains Dispatch (GPC). SDS is granted a Letter of
 41 Agreement (LOA) by USFS-R2 and DOI to mobilize SDS SEATs to federal jurisdictional
 42 fires within SD, NE and WY within the GPC zone under the state contract.

43
 44 SDS Contracted SEATs that are requested to mobilize outside of the GPC zone will
 45 follow the established On-Call SEAT Contract ordering process. Upon approval to fill
 46 the order, the SDS SEATs will be released from the SDS State contract, and will be filled
 47 by the ordering agency under the DOI On-Call SEAT contract.



1 **State of Nebraska SEATs**

2 SEATs are contracted by the Nebraska Emergency Management Agency (NEMA). The
3 contact is Earl Imler. SEATs are located at Chadron (CDR) or Valentine (VTN), NE.

4
5 State of Nebraska Contracted SEATs that are requested to mobilize outside of the GPC
6 zone will follow the established On-Call SEAT Contract ordering process. Upon approval
7 to fill the order, the State of Nebraska SEATs will be released from the State contract,
8 and will be filled by the ordering agency under the DOI On-Call SEAT contract.

9 10 **RMA SEAT Bases**

11 **Category I**

12	GPC	Buffalo, SD	9D2
13	PBC	Canon City, CO	1V6
14	CPC	Casper, WY	CPR
15	GPC	Chadron, NE	CDR
16	DRC	Cortez, CO	CEZ
17	CRC	Craig, CO	CAG
18	DRC	Durango, CO	DRO
19	FTC	Fort Collins/Loveland, CO	FNL
20	GJC	Grand Junction, CO	GJT
21	CDC	Greybull, WY	GEY
22	GPC	Hot Springs, SD	HSR
23	FTC	Broomfield/Jeff Co, CO	BJC
24	GPC	Lemmon, SD	LEM
25	GPC	Mobridge, SD	MBG
26	GPC	Pierre, SD	PIR
27	PBC	Pueblo, CO	PUB
28	GPC	Rapid City, SD	RAP
29	RWC	Rawlins, WY	RWL
30	GJC	Rifle, CO	RIF
31	CDC	Riverton, WY	RIW
32	GPC	Valentine, NE	VTN

33 34 **Category II**

35	PBC	Alamosa, CO	ALS
36	GPC	Alliance, NE	AIA
37	PBC	Elkhart, KS	EHA
38	CPC	Gillette, WY	GCC
39	PBC	La Junta, CO	LHX
40	CRC	Meeker, CO	EEO
41	CRC	Rangely, CO	4V0
42	RWC	Rock Springs, WY	RKS
43	CDC	Worland, WY	WRL

 1 **SEAT Base Category I and II Definitions (per ISOG)**
2 I – Any Large ATB or SEAT Base with an established full service, bulk or Blanket
3 Purchase Agreement (BPA) retardant contract that is published in the IATB Directory.
4 Personnel are either permanently assigned or placed on an on-call status to immediately
5 support Seat operations. Equipment and retardant are on site year-round. All Category I
6 Bases will meet the standards identified in the SEAT Base Checklist(s).

7
8 II – Airports that have been identified as capable of supporting SEAT operations and will
9 support parking mobile loading equipment for a limited timeframe on a call-when-needed
10 basis. Appropriate agreements are in place with hosting airport authority. Personnel are
11 assigned to the base as needed to support short term SEAT operations. A water supply
12 may be identified and available.

13
14 **Large Transport Aircraft**
15 There are no large transport aircraft on exclusive use contract within the RMA. The
16 RMACC will help facilitate all large transport needs within the RMA through the NICC
17 for crew and IMT mobilization. See NMG Ch.50 for further information.

18
19 **Passenger/Cargo Manifests**
20 This form shall be used in conjunction with all large transport operations. FAR 121
21 require a minimum of two copies be furnished to the operator; the sending unit should
22 retain one copy as a permanent record. The NICC requires that personnel weights be
23 separated from gear/cargo weights. (Refer to RMG 10, 80)

24
25 All crews shall be manifested and a copy sent to the local dispatch center within 2 hours
26 of their departure.
27
28

Helicopters: Exclusive Use (EU) Contract

(Refer to NMG 50)

Exclusive use and agency owned helicopters must be ordered through normal dispatch channels and should be used before CWN aircraft. They should always be filled with a roster in ROSS.

Ordering Considerations for EU Helicopters which should be noted in Special Needs:

- Operating Altitude
- Operating Temperature
- High Performance
- Bucket vs Tanked
- Intended Use information for the incident or project to ensure the appropriate aircraft is ordered to meet mission needs.
- Rappel
- Short-Haul capable

RMA USFS, DOI & State Exclusive Use Contract Helicopter Listing**Heavy Helicopters****(Type 1 National Resource)**

USFS R2 (Restricted)

USFS R2 (Restricted)

USFS R2 (Restricted)

Home Base

BJC Broomfield, CO (Jeffco ATB)

CUT Custer, SD

RIL Rifle, CO

Medium Helicopter**(Type 2 National Resource)**

USFS R2 (Standard)

State of Colorado (Restricted)

Home Base

DRO Durango, CO

FNL Fort Collins, CO

Light Helicopters**(Type 3 RMA, all Standard)**

Arapaho-Roosevelt National Forest (USFS)

Pike/San Isabel National Forest (USFS)

Black Hills National Forest (USFS)

Colorado State Office (BLM)

High Desert District (BLM)

Ute Mountain Ute Agency (BIA)

Wind River Agency (BIA)

Mesa Verde National Park (NPS)

State of Wyoming

State of Colorado

State of Colorado

Home Base

BJC Broomfield, CO (Jeffco ATB)

61CO Monument, CO

CUT Custer, SD

RIL Rifle, CO

RWL Rawlins, WY

- Towaoc, CO

- Fort Washakie, WY

- Fort Lewis, CO

- Glenrock, WY

MTJ Montrose, CO

1V6 Canon City, CO

Please see the Interagency Aviation Tech Bulletin IA-07-03 for information regarding restricted category of Aircraft.

1 **Helicopters: Call When Needed (CWN) (USFS and/or DOI On Call)**

2 Orders for helicopters will be placed through established ordering channels. Helicopters
3 for DOI incidents will be ordered under DOI/OAS On Call contracts or Aircraft Rental
4 Agreements (ARA) and paid for using OAS-23/23E Aircraft Use Report form which is
5 entered into the Aviation Management System (AMS). Department of Agriculture
6 incidents will order helicopters under USFS Region 2 (R2) contracts, and will be paid for
7 using form 6500-122, which is entered into the Aviation Business System (ABS).

8 **DOI On Call Small Helicopters**

9 A listing of DOI/OAS approved aircraft can be found at the following website:
10 <https://www.doi.gov/aviation/> and is only available to DOI employees.

11 **USFS CWN Helicopters**

12 Contract information will be shared by the USFS Aviation Management to the field.

13 **Helicopter Call Signs**

14 FAA assigned tail numbers will be used by Exclusive Use and CWN helicopters as the
15 call sign. Out of area aircraft shall utilize their FAA assigned tail number as their call
16 sign when working in the RMA.

17 Example: N2016B = H-16Y (Helicopter One Six Bravo)

18 **Ordering Procedures for CWN USFS and/or DOI On Call**

19 The Type 1 and Type 2 CWN Helicopter program is administered by the National
20 Interagency Fire Center (NIFC) in Boise, ID. All ordering of CWN T1 and T2 helicopters
21 will be done through normal dispatch channels through the RMACC to the NICC. To
22 reassign T1 and T2 helicopters, approval must be acquired through the NICC. (Refer to
23 NMG 50)

24 RMA Type 3 helicopters should be ordered through the following established dispatch
25 channels:

- 26 • For **wildfires**, all T3 orders for CWN will be placed with the RMACC. If none
27 are available within the GACC, the order will be placed with the NICC.
- 28 • For **local projects or prescribed fires**, the T3 helicopter order may be placed
29 directly to the vendor within the RMA. If the order is placed up to the RMACC
30 it must include the appropriate cost comparison documentation.

31 The RMACC should be notified prior to any potential ordering of CWN helicopters for
32 both fire and project work.

33 Documentation in ROSS at the time of hire **must include which contract the aircraft is**
34 **hired under, i.e. USFS or DOI.** A copy of the resource order shall be shared with the
35 HMGB, pilot and/or company point of contact. Cost, helicopter performance,
36 configuration, and incident location will be considered when filling orders.

1 **Minimum CWN Helicopter Module Staffing**

2 (Refer to NMG 20, RMG 20)

3 For any standard, **light** helicopter, a manager plus a minimum of 2 crewpersons will be
4 ordered and assigned via support requests in ROSS.

5
6 For any standard, **medium** size helicopter, a manager plus a minimum of 3 crewpersons
7 will be ordered and assigned via support requests in ROSS.

8
9 For any standard, **heavy** helicopter, a manager plus a minimum of 4 crewpersons will be
10 ordered and assigned via support request in ROSS.

11
12 For any limited/restricted helicopter, a manager will be ordered and assigned via support
13 request in ROSS.

14
15 Refer to the NMG 20 and the Interagency Helicopter Operating Guidelines (IHOG) Ch.
16 20 for further information.

17 **Non-Fire CWN Project / Administrative Work**

18 A project helicopter manager will be assigned to a helicopter for any project work to
19 ensure safety, as detailed in the Project Aviation Safety Plan (PASP). Refer to Agency
20 and local policy for specific requirements.
21

22 **Ordering Considerations for CWN Helicopters which should be noted in Special 23 Needs:**

- 24 • Operating Altitude
- 25 • Operating Temperature
- 26 • High Performance
- 27 • Bucket vs Tanked
- 28 • Long Line required (length: 50', 100', etc)
- 29 • Helicopter Manager identified, with contact info.
- 30 • Intended Use information for the incident or project to ensure the appropriate
31 aircraft is ordered to meet the mission needs.
- 32 • Hand tools
- 33 • Chain Saw Kit
- 34 • Helicopter Support Kit
- 35 • Chase Rig needed
- 36 • Rental authorized if needed
- 37 • Cell phone/laptop authorized for HMGB
- 38 • Flight Helmets
- 39 • Radios
- 40 • Module and Support
- 41 • When using CWN helicopters, module personnel and aircraft will be brought
42 together at a pre-designated place **PRIOR** to arrival at the incident, usually an
43 airport. See IHOG Ch. 2.
44
45
46

Helicopters: National Guard

Commercial resources must be evaluated for reasonable availability prior to National Guard activation.

Colorado Army National Guard

Colorado Army National Guard (CO-ARNG) is located at the Buckley Air National Guard Base in Aurora, Colorado. Their mission purpose is limited to Emergency Life Saving Missions and/or Wildland Fire Fighting Activities as specified in the Colorado Interagency Cooperative Fire Management Agreement.

HAATS (High Altitude ARNG Aviation Training site), located in Eagle, CO provides “graduate level” training to military helicopter pilots flying in mountainous terrain and/or high temperatures.

Nebraska Army National Guard

Nebraska Army National Guard Helicopters are located in Lincoln, Nebraska. Their mission purpose is limited to Emergency Life Saving Missions and/or Wildland Fire Fighting Activities as specified in the Nebraska Interagency Cooperative Fire Management Agreement.

The Nebraska National Guard is responsible for maintaining and providing State assets of ground and aerial wildfire suppression personnel and equipment when authorized by proclamation of the Governor under the Nebraska Emergency Management Act.

South Dakota Army National Guard

South Dakota Army National Guard Helicopters are located at the Rapid City Regional Airport in Rapid City, South Dakota. Their mission purpose is limited to Emergency Life Saving Missions and/or Wildland Fire Fighting Activities as specified in the South Dakota Interagency Cooperative Fire Management Agreement.

Wyoming Army National Guard

Wyoming Army National Guard Helicopters are located in Cheyenne, Wyoming. Their mission purpose is limited to Emergency Life Saving Missions and/or Wildland Fire Fighting Activities as specified in the Wyoming State Interagency Cooperative Fire Management Agreement.

 **Helicopters: Hoist/Extraction**

The Emergency Helicopter Extraction Source list can be found at [http://www.fs.fed.us/fire/aviation/av_library/Revision_9_EHE_Source_List\(06-2015\)508.pdf](http://www.fs.fed.us/fire/aviation/av_library/Revision_9_EHE_Source_List(06-2015)508.pdf)

When ordering a helicopter with short-haul capability, request the aircraft as normal and define the added capability “Short-Haul” in Special Needs in ROSS.

Colorado National Guard Medical Hoist/Extraction Helicopters

The National Guard may have available helicopters, equipment, and personnel for the purpose of medical hoist/extraction needs within the RMA on wildfire incidents. The National Guard units may be ordered through CO State for state incidents or through the RMACC for federal incidents. See tables below.

When the need has been identified for medical hoist/extraction aircraft, the IC will contact the hosting unit dispatch center, who will contact the RMACC. The RMACC will contact the Colorado Office of Emergency Management (COEM) Duty Officer (303-279-8855), the hosting unit's Agency Aviation Manager and the USFS R2 HOS. Use of any Colorado National Guard resources (aircraft, equipment, facility or personnel) requires specific state approval. Written requests should be submitted to the COEM Duty Officer prior to use.

Wyoming National Guard Medical Hoist/Extraction Helicopters

Please see the Emergency Helicopter Extraction Source list for information: [http://www.fs.fed.us/fire/aviation/av_library/Revision_9_EHE_Source_List\(06-2015\)508.pdf](http://www.fs.fed.us/fire/aviation/av_library/Revision_9_EHE_Source_List(06-2015)508.pdf)

South Dakota National Guard Medical Hoist/Extraction Helicopters

South Dakota National Guard helicopters based in Rapid City are UH-60M models with medical hoist extraction capability for medivac operations within the state.

Mobilization of National Guard Helicopters

If a fire incident **occurs on federal lands** within the RMA, the following offices shall contact their respective Guard units:

Colorado	The RMACC contacts the Colorado Office Emergency (COEM) Management Duty Officer 303-279-8855.
Nebraska	GPC (Nebraska National Forest)
South Dakota	GPC (South Dakota Wildland Fire)
Wyoming	The RMACC contacts the Wyoming State Forestry Duty Officer.

In the event that an interagency incident **occurs on State lands within the RMA**, the following personnel shall make contact with their respective Guard units:

Colorado	Division of Fire Prevention & Control (DFPC) Regional or Area Fire Duty Officer 303-279-8855.
Nebraska	GPC (Nebraska State Emergency Management Agency)
South Dakota	GPC (South Dakota Wildland Fire)
Wyoming	Wyoming State Forester Duty Officer with follow-up to appropriate zone dispatch center and the RMACC.

1 National Guard pilots and aircraft will be issued an annual letter of approval by the Forest
2 Service Regional Aviation Officer or their designee. VHF-AM and VHF-FM radios will
3 be installed in all helicopters to allow necessary communication with all other resources
4 assigned to the incident.

5 Currently the USFS has authorized NG agreements in place, and annually issues an
6 approval letter which lists approved aircraft and pilots. There is a joint DOI/USFS
7 agreement being developed.

8
9 Annual interagency training will be provided by Regional/State Aviation Technical
10 Specialists, Helicopter Operation Specialists, Incident Air Operations personnel, and
11 experienced Fire Suppression Specialists. Training will include aviation policy, incident
12 air operations, organization, coordination, communication, dispatching procedures, fire
13 tactics/behavior, and water bucket techniques.

14
15 Commercial sources must be exhausted or not immediately available during times when
16 there is a threat to life and property, prior to activation of Guard units for Federal fires.

17
18 National Guard Liaison Officer (or Principal Advisor) will be mobilized with the guard
19 on all federal incidents. Reference Ch. 50 of the Interagency Incident Business
20 Management Handbook, for specific procedures.

21
22 Communication and coordination notifications should always occur with the appropriate
23 zone dispatch center and the RMACC.

24 25 **Military Training Routes (MTR) and Special Use Airspace (SUA)**

26 (Refer to NMG 50)

27 Military Training Routes and Special Use Airspace that present conflicts with incident
28 related aviation activities will be identified by local units. One source for this information
29 is AP/1B, Flight Information Publication, and “Military Training Routes.” Each dispatch
30 office should download a current edition of the AP/1B. The link requires a NAP user
31 account – <https://fireportal.usda.gov>.

32
33 Special Use Airspace may be found on Sectional Aeronautical Charts. Critical Airspace
34 information pertinent to flight should be organized for easy and rapid utilization; i.e.,
35 displayed on dispatching hazard maps. Further direction may be obtained in the
36 Interagency Airspace Coordination Guide at www.airspacecoordination.net.

37
38 In order to ensure that safe operations can be conducted and continued in areas of
39 increased military aircraft operation, the local dispatch center must inform the military of
40 the presence of USFS and/or DOI aircraft operating in or near military airspace. The
41 military operates high speed flights that are often at low altitudes along prescribed routes
42 called MTRs and in areas of high density military training or in Special Use Airspace
43 (SUA). It is imperative that the military be informed of Land Management Agency
44 aircraft operations to de-conflict the airspace prior to commencing operations.

MTR and SUA procedures:

- Identify the MTRs/SUAs that are impacted.
- Units should develop an overlay using Unit boundary and the AP/1B to identify those routes that affect their area.
- Check routes against those listed in the AP/1B to identify the type of flight, altitudes, and route numbers. Certain data may not be depicted on the AP/1B and is only available through your local military units.
- MTRs change periodically; units need to review the routes quarterly with their unit overlays.
- Air space restriction information is passed to the military through the Federal Aviation Administration (FAA). Sometimes information is not processed in a timely manner. Phone numbers for local military units can be found in the AP/1B MTR publications.

Airspace Conflicts

Individual Dispatch Center Operating Plans must have boundary airspace management procedures identified. Templates are available in the BLM National or State Aviation Plans. For information refer to the Airspace Coordination Guide Chapter 8 and the National Interagency Airspace website at <http://airspacecoordination.net>.

Unmanned Aircraft System (UAS) Intrusion Reporting

All UAS intrusions and problems must be reported to the FAA whether or not there is a Temporary Flight Restriction (TFR) in effect. Field personnel reports to their dispatch center who reports to the RMACC who reports to the appropriate Air Route Traffic Control Center (ARTCC) who reports to their Defense Event Network (DEN). See the RMACC website for a link to the online reporting form at <http://rmacc.info/>.

Use the following **Pocket Card info** as a reporting guide:

UAS Intrusion Reporting Info Guide

- Name & contact info of Reporting Party
- Date, Time & Location of Intrusion
- Latitude & Longitude if possible
- Intrusion Type: TFR or Situational (non-TFR)
- Description of Intrusion/Situation
- Number, Type, Size & Color of UAS(s)
- Altitude (approx) & Direction of flight (NE, SW)
- Law Enforcement Officer (LEO) notified? If so, their contact info
- UAS Operator located? In contact with LEO?
- Agency aircraft on scene? Number & Type(s)
- Agency aircraft grounded? Number & Type(s)

UAS Considerations:

- Collect intrusion info prior to notifying dispatch
- Dispatch notifies the RMACC who notifies FAA ARTCC
- Additional notifications: Regional Aviation Officer (RAO), State Aviation Manager (SAM), Unit Aviation Manager (UAO), Forest Aviation Officer (FAO)
- Consider a TFR if not already issued for incident & is appropriate to request
- File a SAFECOM under Airspace/UAS category
- Collect photos &/or videos for documentation
- Refer to https://www.faa.gov/uas/regulations_policies/ for UAS regulations.

Aircraft Services

Temporary Flight Restrictions (TFR) (FAR 91.137)

Refer to NMG 50 and the Interagency Airspace Coordination Guide Chapter 6 and/or the Interagency Airspace website at <http://airspacecoordination.org/coord.shtml>.

Temporary Flight Restrictions will be established when incident related aviation activities present potential conflict with other aviation activities.

The Federal Aviation Administration (FAA) has streamlined their TFR system. Therefore, requests for TFRs (FAR 91.137) will be placed through Dispatch Centers to the RMACC who will enter the TFR request into the FAA NOTAM (Notice to Airman) Entry System (NES), and follow up with a phone call to the appropriate Air Route Traffic Control Center (ARTCC).

The FAA requires that latitude/longitude information for TFRs must be provided in degrees, minutes, and seconds, including reference to north latitude and west longitude. If seconds information is not available, add two zeros to the description. Do not use spaces, commas or other symbols in the description.

Example: ddmmsN/ddmmssW or 450400N/1174005W.

The corner points should be listed in a clockwise sequence around the requested TFR to avoid “bow tie” depictions.

Consider requesting that the TFR be 3000’ above the highest terrain point due to the Fire Traffic Area (FTA). This will assist in keeping the air attack and other necessary aircraft flying within the TFR.

Dispatch Centers will ensure that the TFR is cancelled through the RMACC as soon as it is no longer required. Refer to faa.gov for a current listing and graphical depiction of TFRs throughout the nation. The DINS website is also available for a current listing of TFRs throughout the nation, without the map or graphics, and includes the Fire Name at <https://www.notams.faa.gov/dinsQueryWeb/>.

Ordering considerations for TFRs

- Order a new Air to Air frequency before placing an order for a TFR whenever possible.
- Timing of TFR request (late in the day) with the expected duration of aviation activities for that day.

When requesting a TFR you will indicate either:

- TFR - 24 hours a day or
- Time Specific TFRs - have a morning start time and an evening closing time.
 - The TFR NOTAM will include the starting and closing time in its narrative.

Refer to RMG Ch.80 for the FAA Temporary Flight Restriction Form.

Infrared Aircraft - IR – Airborne Thermal Fire Mapping

Infrared requests must be placed with the NICC through established ordering channels no later than 1530 Mountain. Requests for infrared flights will be created on the National Infrared Operations (NIROPS) website at <http://nirops.fs.fed.us/rcr/scanner/index.php>. User accounts can be requested by contacting NIROPS directly.

A ROSS A# is required to complete the NIROPS request form. ROSS requests are ordered as a Service - Aviation, Service - Infrared Flight, typically for that evening at 2200 and must be ordered on a daily basis as needed.

See RMG 80 for Infrared Aircraft Scanner Request Form

See NMG 50 for IR Aircraft flight rates

FAA Temporary Control Tower Operations

(Refer to NMG 50)

GACCs within the FAA's Western Service Area (AK, AZ, CA, CO, HI, ID, MT, NV, OR, UT, WA, and WY) may request FAA Air Traffic Control support through the Western Service Area Agreement when Air Operations in support of an incident becomes complex or unsafe at uncontrolled airports or helibases.

FAA Temporary Control Towers are ordered on an Aircraft Request. A lead time of 48 hours is desirable when ordering. Ordering procedures are outlined within the current agreement located at the airspace coordination website if available (www.airspacecoordination.net). The RMACC does not need to forward the request to the NICC.

The Interagency agreement with the FAA requires that a Resource Order and a Temporary Tower Request form be forwarded to the FAA. The forms may be forwarded when the request is made by the RMACC to the FAA's Regional Operations Center (ROC). The current Temporary Tower Request form is located on the RMACC website under the Aviation Forms link, or refer to RMG Ch. 80. In addition, there is a helpful checklist in Chapter 11 of the Interagency Airspace Coordination Guide that aids in requesting a Temporary Tower.

1 If the FAA cannot supply radios, the incident COML will order radios as an Equipment
2 Request through established ordering channels.

3
4 Agreements will be set up on an as-needed basis for South Dakota through Air Traffic
5 Division Great Lakes Region, or through Air Traffic Division Central Region for
6 Nebraska and Kansas.

7 **Dedicated Radio Frequencies and Management**

8 (Refer to NMG 50)

9
10 The RMACC Center Manager will assign an Area Frequency Coordinator during
11 Preparedness Levels 4 and 5. Refer to the National Incident Radio Support Users Guide,
12 NFES 0968. The Communications Duty Officer (CDO) can be contacted at National
13 Incident Radio Supply Cache (NIRSC) 208-387-5644. Requests will be processed
14 through normal dispatch channels.

15
16 **Frequency Management** - Federal and State Land Management Agencies agree to the
17 sharing of specific radio frequencies that are authorized/licensed for each agency. Shared
18 frequencies are to provide efficient, cost effective radio/communication support in
19 protecting life and property. The sharing of frequencies is under the authority of the
20 National Telecommunications and Information Administration (NTIA) Regulations
21 Manual, Sections 7.3.1, 7.3.4 and 7.5.1 and the Federal Communications Commission
22 (FCC) Rules and Regulations, Part 90, Sections 90.405 and 90.407.

23 24 **National Air Guard - 168.6250 Tone 110.9 Transmit**

25 Air Guard is approved as an emergency frequency in an event that the aircraft has an
26 emergency. It is also approved as a hailing frequency for establishing initial contact or
27 redirecting an aircraft, etc. It is not approved for tactical missions.

28 29 **National Flight Following - 168.6500 Tone 110.9 Transmit & Receive**

30 National Flight Following is approved for point-to-point flight following. It is not
31 approved for tactical missions such as recon, fire, projects, etc. A local designated
32 frequency should be used for Initial Attack and Agency or Project frequency.

The National Airtanker Base Frequency

From the Interagency Aviation Tech Bulletin (IATB 2014-01) dated March 21, 2014:
There is no “National Standard” frequency to be used as the go-to tanker base frequency.
Refer to the National Airtanker Base Directory (NFES #2537) for the most current information.

If a tanker base is not listed in the National Airtanker Base Directory, there is no frequency assigned to that base. When a temporary base is activated, a ROSS order must be placed requesting a frequency for that location. Per FAA engineering, each tanker base frequency is authorized for a service volume of 40 nautical miles and a 5000’ ceiling. Each project/all-risk incident service volume is engineered at 20 nautical miles and a 5000’ ceiling. When placing a ROSS order for an Air to Air AM frequency for a temporary tanker base, you will need to state in the request that this is for a tanker base or else the FAA will only authorize a service volume on 20 NM and 5000’ ceiling

Initial Attack Aircraft Frequency Assignments - Each state in the RMA has been divided into zones by the national frequency coordinator. These zones are coordinated with the rest of the nation’s frequency assignments. Each zone has pre-identified Initial Attack frequencies. These frequencies are updated annually. See RMA Frequency Maps for specific information.

All additional frequencies must be ordered from and coordinated by the RMACC. Tertiary Air to Air AM Initial Attack frequencies are available for use. Notification to the RMACC is required, who in turn will notify NIRSC.

Once the incident exceeds the first operational period, all requests for additional firefighting frequencies must be placed through established dispatch channels, the RMACC to the NICC. It may take up to 6 hours for new frequencies to be assigned.

1 **Time Conversion Table – Standard Time**
2

ZULU	ALASKAN	PACIFIC	MOUNTAIN	CENTRAL	EASTERN
0000	1400	1600	1700	1800	1900
0100	1500	1700	1800	1900	2000
0200	1600	1800	1900	2000	2100
0300	1700	1900	2000	2100	2200
0400	1800	2000	2100	2200	2300
0500	1900	2100	2200	2300	0000
0600	2000	2200	2300	0000	0100
0700	2100	2300	0000	0100	0100
0800	2200	0000	0100	0200	0300
0900	2300	0100	0200	0300	0400
1000	0000	0200	0300	0400	0500
1100	0100	0300	0400	0500	0600
1200	0200	0400	0500	0600	0700
1300	0300	0500	0600	0700	0800
1400	0400	0600	0700	0800	0900
1500	0500	0700	0800	0900	1000
1600	0600	0800	0900	1000	1100
1700	0700	0900	1000	1100	1200
1800	0800	1000	1100	1200	1300
1900	0900	1100	1200	1300	1400
2000	1000	1200	1300	1400	1500
2100	1100	1300	1400	1500	1600
2200	1200	1400	1500	1600	1700
2300	1300	1500	1600	1700	1800

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1 **Time Conversion Table - Daylight Saving Time**

ZULU	ALASKAN	PACIFIC	MOUNTAIN	CENTRAL	EASTERN
0000	1500	1700	1800	1900	2000
0100	1600	1800	1900	2000	2100
0200	1700	1900	2000	2100	2200
0300	1800	2000	2100	2200	2300
0400	1900	2100	2200	2300	0000
0500	2000	2200	2300	0000	0100
0600	2100	2300	0000	0100	0200
0700	2200	0000	0100	0200	0300
0800	2300	0100	0200	0300	0400
0900	0000	0200	0300	0400	0500
1000	0100	0300	0400	0500	0600
1100	0200	0400	0500	0600	0700
1200	0300	0500	0600	0700	0800
1300	0400	0600	0700	0800	0900
1400	0500	0700	0800	0900	1000
1500	0600	0800	0900	1000	1100
1600	0700	0900	1000	1100	1200
1700	0800	1000	1100	1200	1300
1800	0900	1100	1200	1300	1400
1900	1000	1200	1300	1400	1500
2000	1100	1300	1400	1500	1600
2100	1200	1400	1500	1600	1700
2200	1300	1500	1600	1700	1800
2300	1400	1600	1700	1800	1900

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